

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 October 2003 (30.10.2003)

PCT

(10) International Publication Number
WO 03/089785 A2

(51) International Patent Classification⁷:

F02P

(21) International Application Number:

PCT/US03/12058

(22) International Filing Date:

19 April 2003 (19.04.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/374,019 19 April 2002 (19.04.2002) US
60/432,161 10 December 2002 (10.12.2002) US
60/450,217 25 February 2003 (25.02.2003) US

(71) Applicant (for all designated States except US): COMBUSTION ELECTROMAGNETICS, INC. [US/US]; 32 Prentiss Road, Arlington, MA 02476 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): WARD, Michael, A. V. [US/US]; Combustion Electromagnetics, Inc., 32 Prentiss Road, Arlington, MA 02476 (US).

(74) Agent: COHEN, Jerry; Perkins, Smith & Cohen, L.L.P., One Beacon Street, Boston, MA 02108 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

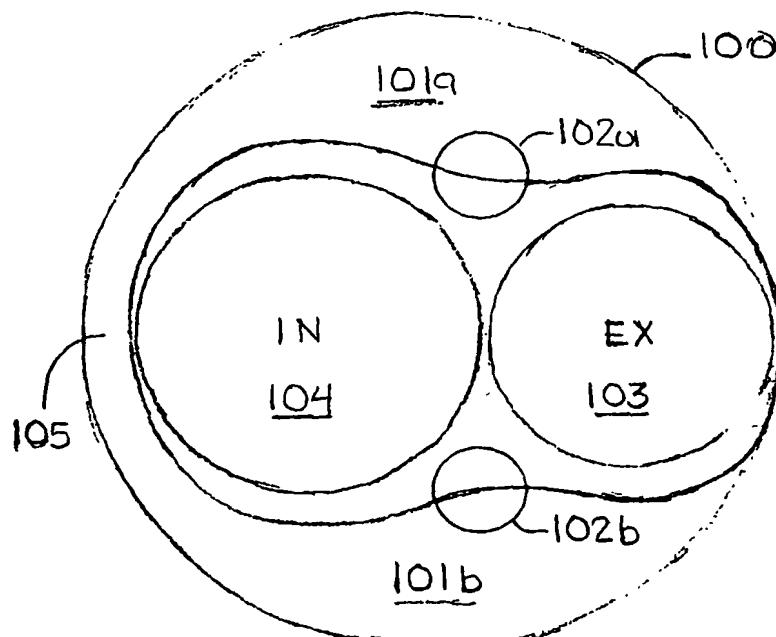
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: IMPROVED TWO-VALVE HIGH SQUISH FLOW I.C. ENGINE



(57) Abstract: An improved ignition-engine system for internal combustion engines comprising a compact combustion chamber in the cylinder head and two main squish zones (101 a, 101 b) for producing high flow and turbulence, and at least one minor squish zone (105) at the end of the intake valve (104), the system using one or two independently operated spark plugs (102a, 102b), placed asymmetrically at or near the edge of the high flow squish zones to handle both ultra-lean light load conditions and high load conditions without misfire or knocking, the engine leanness and high load operation further improved by using variable compression ratio and/or direct fuel injection, including air-blast fuel injectors (181) and more centrally located air-blast-ignition fuel injector (193) more ideally suited for four valve engines and mild hybrid engines.

WO 03/089785 A2